COMPUTERWORLD

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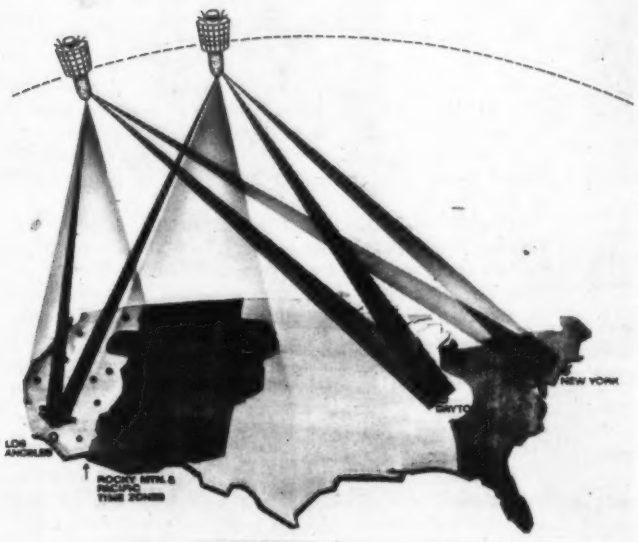

Service Bureau Satellite

Under a plan proposed by the McCall Corp., a Comsat domestic satellite will receive and transmit data via a McCall-assigned channel from a ground station near New York to ground stations in the western time zones. McCall also is asking Comsat to establish another ground station at Dayton, Ohio, for use by the McCall computer center and printing plant there. The plan is designed to provide low cost data transmission for a national network of regional service bureaus as well as for the transmission of material for McCall publications and for television programs. See story on page 2.

NCR to Sell Software For Rivals' Hardware

DAYTON, Ohio – NCR became the first main frame computer manufacturer to enter the booming computer software market this week when it concluded a special marketing agreement with National Computer Analysts (NCA) which gives NCR exclusive marketing rights to NCA's Quick-Draw program. Marketing is to begin next month and will be directed to users of IBM and RCA systems as well as to users of NCR equipment. NCR intends to offer three year lease terms to users, but the exact pricing arrangement was not known at press time.

Worldwide Marketing

C.L. Keenoy, NCR marketing vice president, said the agreement with NCA will permit Quick-Draw automatic flowcharting to be made available to computer users all over the world. NCR has a global marketing organization of 1000 offices in 100 countries.

John J. Sheehan, NCA president, said that Quick-Draw has been under development for several months (CW, Feb. 17) and has been thoroughly tested by a number of users.

Keenoy said the program can be profitably put to work by computer users to achieve high speed flowchart generation and to conserve valuable programmer and machine time. The program automatically provides cross-references by section, paragraph, and data name. By using the computer printed flowchart to call attention to logical paths through the program and any errors in these paths, a user can drastically reduce program debugging time and costs, he added.

"Flowcharting is basic to documenting a new program to achieve rapid understanding of the computer coding," Keenoy said. "But it has always been a tedious and time consuming task for valuable programmers. Quick-Draw provides up to date and standardized documentation, yet it is very economical of both programmer and computer time."

To generate automatic flowcharts and documentation, Quick-Draw works directly from source statements in high level computer languages such as Cobol and Fortran or in assembler language. NCR will offer the generator program on a three year license to computer users working with Cobol, Fortran, or basic assembler languages. The company will begin marketing Quick-Draw within the next month, Keenoy said.

This is believed to be the first time that a major computer manufacturer has entered the general software market, although some manufacturers have made certain software "extra charge" items on their own product line.

Programmer Faces Tax Charges After Gambling With Large Sums

PHILADELPHIA, Pa. – A quarter of a million dollars apparently passed through the hands of a computer programmer here in a two year period – and federal investigators are trying to find out where it came from and where it went.

The programmer's story, according to Justice Department officials, is that it both came and went on the horses. The doubt about what actually happened involves the amounts actually won and lost, which define the programmer's federal income tax liabilities. Government officials admitted they aren't even sure he was playing the horses.

The programmer, Martin E. Gottlob, 34, has been indicted by a federal grand jury on charges of tax evasion and perjury.

(Continued on Page 16)

Two Headed Drive Has Faster Access

SAN MARION, Calif. – A two headed disk drive, plug-for-plug has been put on the market by Marshall Laboratories here. Two have been delivered to users and currently are being installed. A test unit has been operational on a System 360 for four months.

Advantages of the unit to users of the System 360 include a faster random access time – 48 msec. – and a cheaper price – $19,750. These involve no change in the user's operations, simply the plugging in of the unit.

Software Reorganization

In addition, it is possible to double the amount of data directly under the read/write heads if the user is prepared to make the necessary modifications to his software. George Barr of Marshall Laboratories told *Computerworld* that doing so would substantially improve the throughput capabilities of the whole computer system.

End User Sales

The drive, intended for the end user as well as for the computer manufacturers, is said to have a number of "unique" design points selected with the goal of producing a state-of-the-art unit which places as much emphasis on system reliability as on straight performance. These points include:

- A "direct-seek" actuator which uses a binary coded, hydraulic piston mechanism for positioning heads in a single mechanical action.
- Two heads per disk, making it possible to cover 200 tracks with a one inch stroke, and giving programmers the option of treating each disk as two data fields.
- Rugged construction and careful thermal design, thereby substantially reducing the error rate through mechanical stability under adverse environment.

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Has IBM Redesigned the 2311?

NEW YORK – A new version of the most popular IBM disk drive, the 2311, apparently has been developed.

New macros applying to such a unit appear in the latest Disk Operating System release. The unit is referred to as the 2321D, and one of the macros, the DTFA,, sets the track capacity of the device at 4263 bytes, indicating that it has twice the track capacity of the 2311.

The increased capacity would not be unexpected. The 2314 disk drives, which are becoming popular, have four times the capacity of the 2311s. The 2314 has twice as many tracks and each track has twice the byte capacity.

Since the data transmission rate is controlled by track capacity, use of the new unit would be restricted to the larger models of the System 360 line now compatible with the 2314 – unless special engineering provisions were made.

No information about the unit was available from IBM. Industry observers pointed out that it was normal for the company to develop special equipment as well as future product lines, and that the unit might be intended only for some limited, special use.

Marshall M2500 Disk Drive

Earth Satellite to Be Data Link.

NEW YORK – The McCall Corp. will ask the Federal Communications Commission to set aside for McCall one of the channels in Comsat's proposed domestic earth satellite. The channel will be used for the development of low cost data transmission and a new TV programming concept.

One user would be the McCall Information Co. (Misco), a computer services division which plans to establish a nationwide network of regional computer centers. One of Misco's services is the assumption of total management responsibilities for a client's computer activities.

Long-range planning studies by the magazine publishing and printing company point to increased flexibility and reliability as well as a substantial reduction in data transmission costs as one of the principal effects that will flow from the domestic satellite channel. This reduction is especially significant, McCall President Henry E. Bowes pointed out, because such costs are a principal determinant of the feasibility of computerized services when remote locations are involved.

More Services

Lower transmission costs, he said, will enable Misco to broaden its services to outside clients, move more rapidly toward its long-term goal of a nationwide network of regional computer centers, accelerate its providing universities and colleges with computer power, and possibly even extend the benefits of computer services to the homemaker.

Participation in Comsat's satellite program will also contribute to McCall's research work at Graphics Research Laboratory, Princeton, N.J. New systems under development there will speed the flow of information via computer and broad band transmission media from editorial offices to various printing locations.

Misco, which began as a computerized subscription fulfillment service to McCall's three magazines (McCall's, Redbook and Saturday Review) as well as outside magazines, was given divisional status Jan. 1, 1967. Its corporate mission is providing computer based services to clients inside and outside the McCall Corp.

The division is now active in three principal areas, according to James D. Gallagher, who heads up its operations. These are computer programming, computer facilities management, and publishers' services.

Using McCall's expertise as the publisher of mass circulation magazines, Misco offers a service program tailored to publishers' needs, including systems consulting, computer programming, and facilities management.

Total Management

Misco's skills enable it to assume total management responsibilities for a client's computer activities, Gallagher said. In a typical contract situation, Misco would develop a long-range plan as to how the client should structure his computer activity, schedule the phasing in of equipment needed to meet those requirements over the next several years, and conduct the actual operation of the computer facility if necessary, he said.

This McCall developed, keyboard to tape unit will be a first link in transmitting data by earth satellite. Material for publication will be inscribed on 1/8 inch tape, transcribed on computer tape, and input to a computer. The computer will add typesetting and page makeup instructions and send the material, in digital form, to the satellite. The data will be relayed to a distant ground station and then to a printing plant.

Such a program is being performed for Hunt Foods & Industries and, on a smaller scale, for several other companies on the West Coast. However, Gallagher sees outside clients furnishing an increasing share of revenues for this segment of Misco's activities. He expects that as corporations move towards making the most of their information resources with the establishment of integrated, computer oriented communications systems, this will increase the demand for the kind of services Misco offers.

To date, Misco's biggest strides have been made in the educational systems area. Here, it is already providing the total computer requirements for the University of Dayton and Antioch College and is also performing a variety of computerized services for a consortium of small colleges in the Dayton-Miami Valley area. The schools use Misco's Dayton computer center, which is equipped with three IBM 360/50s, a 360/40, and three 360/30s. Consortium members use it for handling administrative functions, computer assisted instruction, and research and development work.

Education Expansion

Gallagher said Misco will move ahead with participation in other multi-university projects and will expand into the adult education field.

"The ultimate use of services like Misco will be in the educational process itself," he said. "It's estimated that we will be facing a shortage of 150,000 programmers and systems technicians in a few years. Furthermore, it is becoming apparent that five or six years from now, the college student who goes through his undergraduate years without exposure to a computer will be considered 'educationally deficient' as far as a career in business or the government will be concerned. This means we will have to come up with new teaching techniques both for the student who wants a career in the computer sciences and the student who can gain from the benefits that a computer can bring to his selected field of specialization. And we will have to introduce these techniques at an earlier stage in his school life than is being done currently."

Gallagher said that the consortium idea will spread because it enables smaller schools, which can't subsidize the required sophisticated equipment on their own, to gain the benefits of computer power through joint sponsorship. Furthermore, he added, "such an arrangement creates a viable and living laboratory in which Misco's computer expertise and the schools' educational expertise can be blended to test out innovative and fresh approaches."

Lower Rates

The domestic satellite will enable Misco to move towards the development of a complex of computer utilities. Not only will the satellite open up a new, low cost medium of data transmission, he said, but it will force existing ground carriers to lower their own rates to remain competitive.

McCall's computer utility could take the form of specialized data banks for colleges and universities, a time sharing network for professionals who need instant access to a computer, and even, possibly, an "electronic library" for homemakers seeking information on products and services. The latter type of facility would be greatly aided by McCall's own vast reservoir of information generated by its three magazines.

Currently, Misco operates data processing centers in Dayton, Ohio; Hayward and Fullerton, Calif.; and in Washington, D.C. Expansion plans call for the opening of a computer center in Atlanta and the installation of an IBM 360/50 in Fullerton, where three IBM 360/30s are already in use. Opening of a computer center in New York City is also under consideration.

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Computer Group Formed, Largest Outside of U.S.

LONDON, England – International Computers Ltd., the huge new British computer group, formally came into existence on July 9th, with the decade-old ICT changing its name. The process will be finalized next month when English Electric Computer joins the new firm.

The impending creation of the group, the largest computer organization outside of the United States, was announced late in March (CW, April 3).

Under the new organization plan, ICL and English Electric have become wholly owned subsidiaries of a new holding company, International Computers (Holding) Ltd.

Another computer firm, Plessey Ltd., and ICL have formed a joint company, Data Communications Sciences Ltd., to investigate and exploit long-term developments in computer and communications systems.

English Electric and Plesey will retain their respective computer interests in defense systems, industrial automation, process control, and similar applications.

New York Office Planned

While ICL does not plan to sell to the retail market in the United States, it does plan a substantial expansion of marketing activities directed at international corporations and will open an office in New York City in addition to its office in Garden City, Long Island. This effort will be in support of direct sales to these corporations in connection with their activities outside the United States.

ICL also plans to continue and expand its marketing of peripheral equipment to original equipment manufacturers in the United States.

The British government was deeply involved in the merger and is expected to provide 13.5 million pounds in research funds to ICL over the next four years.

Peripheral Firm Says Procurement Was Biased Against Independents

WALLED LAKE, Mich. – Bryant Computer Products has launched an official protest about an Air Force computer procurement, alleging that it was discriminatory against the independent peripheral manufacturers. It also stated that it intends to protest all federal government procurement policies until "all members of the computer industry have a right to bid on any portion" of a government computer system.

The protest, filed with the controller general, was specifically directed against the requirements laid down by the Air Force for computer systems to replace the equipment currently installed in Battle Creek, Mich. – not very far from the headquarters of Bryant Computer Products. It was through a similar protest a year and a half ago that Honeywell overthrew the Air Force Phase II award, which eventually went to Burroughs Corp. on a rebid.

Main Argument

While the protest has been lodged against the exclusion of the peripheral manufacturers, directly or indirectly, the main argument in the protest was directed at showing that the time-frame and methodology of the Air Force procurement prevented indirect bidding (i.e., supplying equipment as a subcontractor to the main vendor), apparently considering it obvious that direct bidding on any of the parts of the system was clearly not possible.

The arguments put forward were that the time-frame allowed by the Air Force asked a contractor to submit a letter of intent to perform an expensive, but mandatory, benchmark less than three weeks after the request was published. The short length of time was said to prevent a manufacturer from working out the necessary details with an outside contractor. The use of a live-test benchmark as a mandatory qualification was said to be putting up the cost of being considered as it would involve a manufacturer in actually obtaining the outside suppliers' equipment whether or not he eventually got the sale.

Indirect Bidding Sought

The protest asked that the Air Force reopen matters and implement a policy which would allow an independent to bid via a computer manufacturer. It did not ask that direct bidding by outside suppliers be made standard policy.

An Air Force spokesman, contacted by *Computerworld,* said that the proposals currently were under evaluation, and that it was anticipated that a supplier would be selected "sometime this year." No further details were available.

Frederick S. Hammer, President
Leasco Systems & Research Corporation

Hammer to Head Leasco Systems

BETHESDA, Md. – Frederick S. Hammer, former director of the research division of the Federal Deposit Insurance Corp., has been appointed president and chief executive officer of Leasco Systems and Research Corp. here.

Eugene E. Miller, the former president, has become chairman of the firm, a subsidiary of Leasco Data Processing Equipment Corp.

Hammer, 31, formerly a vice president and assistant to the chairman of Bankers Trust Co., New York, took a leave from the bank from October 1966 to March 1968 to work for the FDIC in Washington.

While with the FDIC, Hammer initiated a nationwide banking research program and managed a large scale computer operation for the processing of reports from the banking industry.

A former adjunct associate professor of finance and economics at New York University's Graduate School of Business Administration, Hammer holds a doctorate in managerial and mathematical economics from Carnegie-Mellon University.

Disk Pack Certifier Under Development

PHOENIX, Ariz. – David Buchanan, president of Peripherals Inc., believes that the disk packs currently being supplied to computer users are in need of certification in much the way that most magnetic tape is now certified before use. "Much has been said about disk packs," he told *Computerworld,* "and much has been done about disk packs, but not much has been done about the certification of them."

He then revealed that his company is about to market a new disk pack certifier, the Pack/Scan 1, which he believes will be the first disk pack certifier to become commercially available.

Makes Disk Certifiers

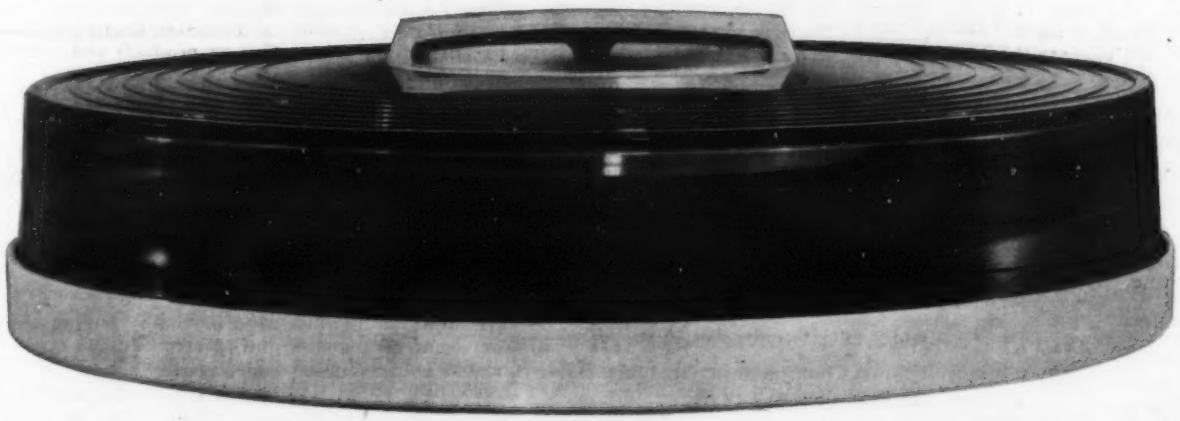
Peripherals Inc. is already part way into the pack certification business with its Model 316 Disk Tester, which it has delivered during the past eight months to all U.S. manufacturers of disk packs except Caelus Memories and IBM (which make their own testers).

However, from the user's point of view, the 316 has no direct value, because it simply checks separate disks – and not the packs after they have been assembled. Currently, final testing usually is done on a System 360 by writing on and reading from all the tracks. But this method has certain weaknesses which, it is hoped, a pack certifier will avoid.

Standards Committee

Currently an effort is being made within the USASI X3.2.2 Committee to produce some standard specifications for the 2311-style disk packs. However, no report is expected from the committee for some months.

$300.00



The ATHANA 1316 Six-Disc Pack

The Athana 1316 Disc Pack meets or exceeds specifications and performance standards of the IBM 1316 Pack. This precision assembly of six magnetic oxide coated discs, provides ten recording surfaces. Each surface is manfactured under computer controlled procedures assuring a uniformity of excellence unsurpassed in the industry. This quality level further assures a repeatability of performance from surface to surface and disc to disc. The Athana Warranty: "For repair or replacement due to manufacturing defect *for as long as you use it"* is indicative of this quality assurance.

Disc Drives Compatible with Athana 1316 Disc Packs:

IBM	1311, 2311
Honeywell	H256, H258, H259, H259A
RCA	564
G.E.	DSU 160
C.D.C.	854, 952
Univac	8411

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Editorials

Our Roll of Honor

On the front page last week we published a list of six computer companies. These companies have just signed new contracts with the federal government – and have agreed to stand behind their written words, whether in their proposals, in their literature, or anywhere else. We salute them, because this agreement marks the graduation of computer ***hardware*** suppliers to the level of computer ***system*** suppliers. As all of us know, there is a great difference.

We also salute them for that reason. We know how difficult it is to forecast performance. How many things can change matters – items which have never been discussed. We frankly anticipate that sometime in the future they may wonder why they were ever so foolhardy as to agree to anything so stringent as these new contracts. But we are sure that they have helped bring forward the day when users can implicitly rely on the promises of their computer suppliers.

Privacy Is Tricky

The solutions to problems of computer privacy have been taken a step forward, we think, with the acknowledgement that present law does not provide a right to privacy. As long as we deluded ourselves that legislation was not necessary, we were evading the main issues and effectively passing up opportunities for action.

At the same time, it must be said that many will feel the admission, made in the Miller paper on privacy (CW, July 17), is a step backwards. The idea that privacy can be found enshrined in the Constitution, just waiting for the appropriate case to reach the Supreme Court is nice – because it commits us to no real action, while providing us with plenty of opportunity to make Brownie-point speeches.

Computerworld hopes that persons on both sides of this argument will see that in material matters there is no conflict between them. The believers in constitutional safeguards on privacy can press their argument – and still help codify and support specific proposals for a new law, while there is no possible reason why those who do not believe in the adequacy of the constitutional approach should obstruct any test of it.

Computers, as presently used and planned, potentially can invade privacy. Some action is needed. And the sooner we get into action the surer we will be of getting it.

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That Software Patent

Patent Office's Long History Affects Your Rights Today

There's an old legal saying that "hard cases make bad law." What it means is that when a judge (or a legislature) twists the law so as to make it fit his idea in a specific case, it tends to result in consequences which he had not thought of – and which he often does not like.

1860 Decision Affects You

Such a case which concerns you quite directly occurred over a hundred years ago when a man called Philip Thomas took over the U.S. Patent Office for a few months. (He later became secretary of the treasury.) He was concerned about the problems which occurred when two people both claimed to be the inventor of something or other. And so, he took one of his ablest examiners and set him aside to hear and determine the arguments about these cases (technically known as interferences).

Busy Patent Office

It was quite a sacrifice for him to do this. The Patent Office was booming – if you judge by the number of patents which were being issued. In 1857 it issued 2,910 patents – about 35% more than Great Britain, which at the time had a far larger population. (Russia only granted 24 patents that year.) Even the President of the United States was in the inventing game. Lincoln, believing that "the patent system added the fuel of interest to the fire of genius," and, after being stranded on the Mississippi and the Great Lakes, patented a device for buoying vessels over shoals. But despite the patent boom, the staff was not increased. There were only 12 examiners, so putting one of them aside to handle interferences must have hurt.

Who Invented First?

Still, there was the question of morality. Inventions belonged, so Thomas believed, to those who made them first. The fact that a man lived in a faraway place and was not easily able to produce the models of the invention which were required, and to send them to Washington, should not, he felt, hurt a man's chances of becoming rich. And so the Patent Office started delving into the tricky area of exactly when an invention occurred.

Date of Filing Decisive Elsewhere

People in other countries had faced the same problem. But they came up with a different answer. They generally had no one specially set aside to decide the question thoroughly, so they had to have a quick and easy system. They had. They looked to see when the application had been filed. Their rule was "whoever files first is the inventor," and it has worked well for them. In general this is the rule in most of the free world, but not in the United States.

Here, it is "whoever first invented the item is the inventor."

Beware a Prior Inventor

So all inventors, including you if you are considering obtaining patent protection for some of your programs, have to be prepared to show when you (a) conceived the invention, and (b) when you "reduced it to practice."

If you cannot do this, you stand a good chance of finding yourself out of luck because someone else who did bother to document the process of invention will be ruled the "prior inventor" and as such entitled to the patent.

Four Rules

The problem is how to best protect yourself.

The first rule is *discover what you are protecting* – and what is purely incidental. If you do not do this, then your documentation of the invention will tend to be cluttered up with incidentals and not include the important items. The documentation has to show that you really appreciated the invention, that you realized what you were doing. If you include too many unnecessary details, this may not be clear to others.

Four Key Rules to Remember For Protecting Your Invention

1. Discover what you are protecting.
2. Keep original documentation.
3. Have documentation witnessed.
4. Check with a patent attorney.

This is particularly important in the case of computer program protection. It is currently not certain that you can patent a program, but it is highly probable that you can protect an original program by patenting the valuable invention within it.

To take the case of the Goetz patent: nothing in it protects any particular program, but any read-forward oscillating soft program is apparently covered, and Martin Goetz can apparently exclude anyone else from using such a program!

Thus, although the program may be what is being protected, you may never need to mention it specifically!

Keep Documentation

The second rule is simply to *keep documentation.* This is important, and it must be original. Patent lawyers advise the use of bound books, carefully dated and without any erasures (simply cross out – neatness does not matter). They do not like loose leaf items – and as for computer printouts, or updated documentation which generally fails to show when the updating occurred or what was there before – they have not faced up to that yet.

The third rule is *have it witnessed.* There is a popular fallacy which says that all you have to do to document your invention date (and therefore invention priority) is to send a copy of the documentation concerned to yourself by registered post. This is not considered adequate evidence by the Patent Office. You have to have some outside person, who is technically capable of realizing what you have done (don't just use the church minister because you trust him not to talk), to go over the documentation, to sign it and date it, and perhaps to have his signature witnessed by a notary public.

Consult An Attorney

The fourth, and last rule, is to *check up every so often with a patent attorney.* You can get a list of registered patent attorneys in your area simply by writing to the Patent Office and asking for one. He can review your actions and let you know what is best for you to do. American patent law is not simple. Guidance will help you protect your invention.

Accident Maybe – But Still Important

These then are some of the major rules which hold when you go about protecting computer programs. They are necessary because of historical accident – but that does not make them any the less necessary.

Research Report

Timing Vital to Figuring Tape Error Costs

In an earlier article (CW, July 10), we discussed the tape movements which occur when permanent error is found on a magnetic tape during a read or a write operation. Contrasting the actual, rather complex movements with the ones assumed during traditional approaches to tape error costing, we noted that:

1) The tape movement was different for each of the three cases involved: reading a faulty record, writing over a faulty area, and reading over a "skipped" area.

2) The tape movement was determined by the operating system, rather than by the programmer.

Before these movements can be converted to dollars and cents cost, however, they must be timed. Timing brings yet another variable into play – the operating timings of the tape transport. These can be surprisingly different one from another, particularly in the time taken to change direction. In the IBM System/360 line of tape transports, one of the two 60KB/sec. units (although they have the same transfer rate) takes nearly eight times longer to reverse directions than the other.

Two Basic Tables

To help bring out just what the timing factors are, Table 1 shows the basic units making up the time spent on each of the three errors. Table 2 shows the values of these units for each of the six major IBM 2400 models.

Putting these tables together is quite easy for any specific operation, although hard to prepare for a single overall operation.

An example of the possible use of the Basic Table.

Problem: To compare the cost of tape errors which can be expected during a 200 pass, full length test when Tape A has two flaws to start with, and generates one additional flaw half way through the test, and Tape B has no flaws to start with, but generates five at equal time intervals during the test.

The equipment assumed is the IBM 2400 Model VI, and the test consists of alternate writing and reading. The block length is held constant at 1042 so as to make the block length the same as the interdata gap and so provide for 50% utilization of the tape.

Method: First work out the incidence of error occurrences which can be expected during such a test for both tapes. Tape A, for instance, can be expected to average 0.25 read-back failures, i.e., where the tape cannot be read because an error has been generated since it was written. This comes from the fact that a single generated error is just as likely to occur between the read and the write (where it does no harm) as between the write and the read (where it may cause a problem) and because only 50% of the tape is used for data, so that there is a 50% probability that the flaw will fall between blocks.

Such a Table is shown in Figure 1.

Then using Table 1, break down the number of anticipated tape failures into their component actions. The 0.25 chance of a read-back failure on Tape A breaks down, for instance, into 250 interdata-gap movements, plus 50 direction changes, and 250 block lengths.

When you have broken down the cases involved, then total them in their specific categories, as in Figure 2.

Then, taking Table 2, evaluate each of the totals in terms of time lost, converting the milliseconds to seconds. Then, when you have again simply added the totals, you have the desired comparison which applies to your particular situation – including your software and your transports. Figure 3 shows the final result.

That is one way of using these basic tables. There are others which we will cover next time.

Two Basic Tables ↓ Are Used to Solve a Problem →

Typical Problem Work Sheets

Type of error	Incidence of error anticipated	
	Tape A	Tape B
Error being generated between write & read-back	0.25	1.25
Errors caught during write operation	50+50+25=125	40+30+20+10=100
Tape passed over during read because of skipping	125	100

Figure 1. *Example of worksheet showing incidence of errors during 200 passes of two types of tapes.*

Type of Actions Involved	Incidence of error anticipated	
	Tape A	Tape B
Passes over interdata gaps	0.25 x 1000 +125 x 2 =500	1.25 x 1000 +100 x 2 =1450
Passes over data blocks	500	1450
Reversing directions	0.25 x 200 + 125 x 2 = 300	1.25 x 200 + 100 x 2 = 450
Passing over unused tape (inches)	125 x 3 + 125 x 3 = 750	100 x 3 + 100 x 3 = 600

Figure 2. *Example of worksheet, showing the incidence of errors during 200 pass test broken out into incidence of specific events during the test.*

Time involved in specific actions	Time waste anticipated	
	Tape A	Tape B
Passes over interdata gaps	500 x 6.2 msec. = 3.1 seconds	1450 x 6.2 msec. = 7.25 seconds
Passes over data blocks	500 x 6.2 msec. = 3.1 seconds	1450 x 6.2 msec. = 7.25 seconds
Reversing direction	300 x 16 msec. = 4.8 seconds	450 x 16 msec. = 7.2 seconds
Passing over unused tape	750 x 9 msec. = 6.8 seconds	600 x 9 msec. = 5.4 seconds
Total time wasted	17.8 seconds	27.1 seconds

Figure 3. *Worksheet derived from Table 2 and Figure 2, showing an example of the use of the tables to produce figures for comparative time waste due to error conditions on two prespecified tapes which average the same number of errors per pass.*

Type of Error Causing Time Loss	Time Lost Under Standard Software: Passing Over Interdata Gaps (No. of times/occurrence)	Passing Over Data Blocks (No. of times/occurrence)	Reversing Direction (No. of times/occurrence)	Passing Over Tape Lengths (No. of times/occurrence)
Attempted reading when an error has occurred since the data was written (Figure 2. CW, July 10)	1000	1000	200	0
Attempted writing where a tape flaw exists (Figure 3. CW, July 10)	2	2	2	3
Passing over an area which has been skipped (Figure 4. CW, July 10)	0	0	0	3

Table 1. Breakdown of actions which occur when different types of tape errors are met by an IBM 360 tape system.

IBM 2400 tape transports	Interdata Gaps (millisec.)	Data-Blocks* (millisec.)	Reversing Direction (millisec.)	Inches of Tape (millisec.)
Model 1	16.0	N/30	264	27
Model 2	8.0	N/60	32	13
Model 3	5.3	N/90	16	9
Model 4	18.7	N/60	264	27
Model 5	9.3	N/120	32	13
Model 6	6.2	N/180	16	9

Table 2: *N = Number of bytes in the block

Time involved in various actions on different models of the IBM 2400 tape transports.

TLW Computerworld Corner

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Item 3:	1401 C4, 1402-1, 1403-2, 1406-1, 4-729II's. Advanced Programming, Print storage, Numerical print, Hi-Lo-Equal, and others. AVAILABLE Nov. 1968	Banking
Item 4:	1406-3. Additional Storage Available. August, 1968.	—
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Voorhes Hired To Solve City's Traffic Snarls

The City of Charlotte, N.C., has selected Alan M. Voorhees and Assoc., Inc. to make a comprehensive study of the city's traffic congestion. Voorhees, a wholly owned subsidiary of Planning Research Corp., will develop specific recommendations for applying the most advanced traffic engineering techniques to the Charlotte street system.

A follow-on contract valued at more than $500,000 has been awarded by the Army Materiel Command to Computer Sciences

CONTRACTS

Corp. for the development of a computer based management information system known as Pemars (procurement of equipment and missiles, Army management accounting and reporting system). This system will provide the required information for the administration of appropriations at all levels within the Army Materiel Command.

Sixteen computer firms have been invited by the Electronic Systems Division of the Air Force Systems Command to submit proposals for installation of electronic data processing equipment at Wright-Patterson Air Force Base, Ohio. The new equipment will provide centralized scientific computational capability in support of the Aeronautical Systems Division.

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R. L. Lane

J.E. Fitzpatrick

J.W. Lola

J.F. Niemoller

15,000 Imprinters Ordered for 'Bankmark' System

Credit Systems Inc. (CSI), St. Louis, Mo., has ordered more than 15,000 imprinters worth more than $750,000 from the Farrington Manufacturing Co., New York. The variable amount imprinters will be used to handle all processing of a new charge card plan called "Bankmark." The Model 889 prints billing information on sales invoices which can be optically scanned and fed directly into the Bankmark computer system.

Philco-Ford, Willow Grove, Pa., has received a Cobol compiler from Information Development Co., Santa Ana, Calif. The project was completed in less than 10 months elapsed time, well within time and money budgets, and cost less than $300,000.

The National Weather Records Center and the USAF Data Processing Division, Asheville, N.C., have installed two RCA Spectra 70/45 computers. The system is the first data processing facility to be jointly managed by a military and civilian agency and is to be used in the collection and processing of worldwide weather observations and in the preparation of environmental defense studies.

Gulf Oil Corp., Houston, Texas, has ordered two RCA Spectra 70/45 computers and related peripheral equipment for its data processing center to handle billing of travel card customers west of the Mississippi and in Ohio and Michigan.

Computer Utilization, Inc., Austin, Texas, has installed an RCA Spectra 70/35 computer at its data center for use in applications ranging from manufacturing process control to analysis of econometrics (application of mathematical techniques to solve, test, and demonstrate economic theories).

Orders and Installations

The School of Business of Belmont College, Nashville, Tenn., has ordered a Univac 9200 system. The computer primarily will be employed in the instruction of students in the operation of data processing equipment but also will be used for registration of students and for general accounting purposes. It is planned as a replacement for punched card equipment.

Hydra Computer Corp., Raleigh, N.C., has installed a CDC 1700 computer system for scientific, technical, and business data applications. Included in the system are the computer, a disk storage unit, two magnetic tape units, a card reader and punch, a paper tape reader and punch, and a line printer.

An order has been placed by the Global General Insurance Co., Toronto, Ontario, for an NCR Century 100 computer. Delivery is scheduled for later this year. The system will be used to issue automobile renewal policies automatically. NCR 736 magnetic tape encoders will be used for daily input of policy application data, claims, commissions, and other statistical data.

Petty Geophysical Engineering Co., San Antonio, Texas, has installed a CDC 3300 multiprogramming computer for processing records obtained during seismic exploration.

VIP Tour

Visiting the computer room during dedication ceremonies at the new headquarters of Computer Time Sharing, Inc., in Chaska, Minn., are, left to right, CTS President Lachlan Reed; Rep. Ancher Nelsen; George Klein, president of the Chaska First National Bank; and State Sen. Henry T. McKnight. The year-old time sharing service company has a CDC 3300 installed and a second on order.

NCR Expands Its Service Centers To Support Century Series Users

DAYTON, Ohio – The National Cash Register Co. is expanding its centers serving users of NCR's recently announced Century Series computers.

New customer facilities will be opened in Dallas, Atlanta, and Hawthorne, Calif. Others will follow. They will be used for testing customer computer programs, for equipment demonstrations, and for the training of both customer and NCR personnel.

The centers will supplement similar facilities here and in Hartford, Conn. The latter facility, opened last year, was one of the first such systems centers to be

Expansions

established by a computer manufacturer.

Honeywell Opens Office

WELLESLEY HILLS, Mass. – Honeywell Electronic Data Processing has opened an office in Ottawa, Canada, according to Cameron Burns, senior sales representative. The office will house five sales and systems representatives and eight field service representatives.

COMPUTERWORLD

education

New Literature

Brandon/Systems Press Preparing Five Books

Brandon/Systems Press has announced the titles of five books it will publish later this year. *Computer Sciences for Management, Planning by Network, Management Planning for Data Processing,* the *Handbook of Data Processing Management,* and *Documentation Standards.* Already published are: the *Aptitude Assessment Battery: Programming,* and *Data Processing '68.* For information, write Brandon Applied Systems, Inc., 30 E. 42nd St., New York, N.Y.

Description and specifications of the Ampex Models ATM-13 and ATM-13 II core memories for airborne, land-mobile, and shipboard data gathering are contained in new brochures C039 and C077. Write to Ampex Corp., Mail Stop 7-14, 401 Broadway, Redwood City, Calif. 94063.

Scientific Data Systems has published a new 12 page brochure describing its SDS 945 time sharing systems and software. To obtain a copy of publication 64-09-01A, write to the Advertising Department, Scientific Data Systems, 1649 Seventeenth St., Santa Monica, Calif. 94040.

A new brochure describes the DDP-516, covering changes in the main frame cabinet, drawer construction, cooling system, and power supply. Electro-magnetic interference, suppression shock, and vibration specifications are included. Write Honeywell Computer Control Division, Old Connecticut Path, Framingham, Mass. 01701.

College Joins Dartmouth Network

HANOVER, N.H. – Windham College in Putney, Vt., has joined the Dartmouth Regional Computer Consortium under a special National Science Foundation grant. The college has ordered the immediate installation of a Teletype, with a second to be installed in the fall.

The consortium, which operates an experimental time sharing network serving a number of New England colleges and secondary schools, is trying to set up a multiplex system to connect five terminals at Mount Holyoke College to the computer center here via a single, voice grade land line.

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Bell System Employees Play Financial Management Game

LISLE, Ill. – Students at the Bell System Center for Technical Education here spend a great deal of time playing games. The students are telephone company employees and the "games" are management decision exercises simulated on a computer.

The center, opened late last year, provides a 15 week education program in telephone science and engineering for both new and experienced technical employees and shorter courses in applied engineering for experienced personnel.

Highlighting the program is the advanced financial management game in which students play the role of top management. Using a 360/40, the students simulate company operations as much as three years ahead.

"The game poses a dual problem for the students," said Charles J. Sener, director of the center. "It requires them to handle day to day operations and to plan for the future at the same time."

The students, working in teams to solve game problems, have unlimited access to the computer through an IBM time sharing program called RAX (remote access computing system).

During the game, students face a series of complex management questions. How much money should be spent on new equipment? What products should be offered? Are facilities adequate in a given area?

Based on information on "current" conditions, the students decide how to spend their funds and make estimates on their "company" growth for a quarter of a year.

The computer responds with a report on how operations would be affected under the conditions specified. The reports spell out income and expenses plus other necessary data.

Periodically, instructors pose unexpected situations: Students may be told they have more or less money to spend on a given project than anticipated, or that a storm has knocked out phone service over a wide area, and decisions must be made immediately to restore service.

The unexpected factors are fed into the computer, and a revised report of the quarter's operations is prepared. The students adjust to the situation and plan for the next quarter.

"These problems remind the students of the challenges management faces," Sener said. "We try to prepare our people to expect the unexpected.

"The computer permits us to assign projects that would otherwise be impossible because of the paper work," he added. "We regard it as a valuable tool to help our people reach their most important goal: improved customer service."

Catholic School Personnel Study EDP

SAN FRANCISCO, Calif. – Seminars designed to help the nation's Catholic schools automate the handling of records are being conducted in eight archdiocesan cities by the National Catholic Education Association and the National Cash Register Co.

The association recently received a $60,800 Ford Foundation grant for the introduction of long-range planning techniques into the church's elementary and secondary schools.

Project director is Dr. Anthony Seidl of the University of San Francisco. An initial group of 100 selected persons is being trained. These, in turn, will introduce the techniques to other schools.

The presentations thus far have been held in New York, New Orleans, Chicago, and San Francisco. In September, they are scheduled for Philadelphia; Minneapolis; Lansing, Mich., and Portland, Ore.

Simulation Techniques Short Course Offered

BERKELEY, Calif. – A short course in simulation techniques will be offered Sept. 23 to Oct. 4 at the University of California Extension Center here. It will cover basic concepts and a variety of applications, and include lecture and problem-solving sessions.

Roy Harvey, a mathematician with the Standard Oil Co. of California, will be the principal instructor. Other lecturers will be Ronald Wolff of the University of California at Berkeley, James Baker of the Lawrence Radiation Laboratory, George Marsaglia of the Boeing Scientific Research Laboratories, Philip J. Kiviat and George Fishman of the Rand Corporation, Ernest Koenigsberg of the Matson Navigation Co., James E. Matheson of Stanford Research Institute, and Henry Claycamp of Stanford University.

The registration fee for the two-week course is $350. Three units of credit are offered. For details, write: University of California Extension, 2223 Fulton St., Berkeley 94720.

Control Data Adds To Seminar Program

WASHINGTON, D.C. – Two new courses have been added to the management seminar program offered by Control Data Corp. through its subsidiary, C-E-I-R, Inc. The courses, part of an expanding fall curriculum, are "Microfilm Information Systems" and "Computer Assisted Instruction and Explanation."

The microfilm seminar is designed for systems analysts and management personnel interested in establishing a document retrieval system. The seminar will emphasize microfilm system concepts, system evaluation, and hardware considerations.

The other seminar is designed for managers, personnel directors, and training directors from industry and government, as well as educators and administrators from all levels of education. A knowledge of computer fundamentals is not a prerequisite for this seminar. The seminar will enable participants to plan successfully a computer based instruction program that meets the needs of their company, bureau, or institution.

For details, write: Registrar, Institute of Advanced Technology, C-E-I-R, Inc., 5272 River Rd., Washington, D.C. 20016.

Granite Equipment Buys EDP School

NEW YORK – Granite Equipment Leasing Corp. has acquired the American Institute of Technology for an undisclosed amount of stock.

Harvey Granat, Granite president, said that acquisition of the institute, an accredited computer programmer training school based in Phoenix, Ariz., with a branch in Tucson, "marks Granite's entry into and commitment to the field of computer education."

Students Learn Fortran In Math Class

HINSDALE, Ill. – Students at Hinsdale Central High School are learning Fortran in a math class. The new language enables students to communicate with an IBM 1130 computer recently installed at the school and used in a two semester, computer mathematics course offered as an elective to juniors and seniors. The students learn how to program and operate the system, write administrative programs, and special programs for student and faculty projects.

Discount Offered

WASHINGTON, D.C. – A 66% off-shift computer time sharing discount to qualifying educational institutions is now being offered by Comnet (Computer Network Corp.), a Washington based, remote computing service organization.

The discount applies to all conversational mode processor charges at all times that the Comnet remote computing system is available other than 8 a.m. to 6 p.m., Monday through Friday, including each weekday evening until midnight, all day Saturday, and often all day Sunday.

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EDP industry report

Computer Power Put on Wheels.

The benefits which digital computers can provide for law enforcement agencies have been propounded by "experts" from all walks of life. Applications proposed vary from bookkeeping to crime prediction. Rather than discuss the loftier objectives, this report will be concerned with the problems in making the computer accessible to the police officer on the street, the front line in the battle against crime.

To avoid the confusion of terminology, the word "computer" is defined here in its colloquial usage as any automated data system since the present need of the police officer is for stored information rather than computation.

The continuing extension of computer terminals into communication centers for use by the dispatchers is a big step in providing the police officer with supporting information on stolen property, known criminals, missing persons, etc. Such a system can be instrumental in avoiding false arrest on the one hand and premature release from lack of adequate information in the field on the other. This information was previously available in the records section, but the time involved in requesting it and obtaining a response was often intolerable.

Of course, we must recognize one overriding problem affecting every mobile system. This is the quantity of communication that must be handled over a limited number of radio channels available. Dispatch traffic takes precedence and in some systems often precludes all other messages except for emergency assistance calls. This situation concerned with public safety demands correction. The Federal Communications Commission has allocated additional ultra high frequency channels and significantly, some of these have been reserved for mobile printer usage. Certainly, the FCC will recognize that mobile printers are just a limited part of needed, complete, two way, data systems. Assignment of these newly allocated channels is pending a FCC study now in progress.

Heretofore, the computer has been available in some areas for applications such as those mentioned previously. The Automatic Statewide Auto Theft Inquiry System in California is one used for license or vehicle identification. In such a system the field patrolman radios to headquarters with a voice message which is relayed by headquarters personnel to the computer via teletypewriter. The response utilizes the same transmission media.

An improvement in mobile system efficiency can be obtained by printing the response directly in the vehicle, thus eliminating the conversion to voice. This approach has been prevented in the past by the lack of mobile printers and the restrictions on public safety radio channels to F3 (voice) modulation, both problems that will be overcome in the near future.

A further improvement in mobile system efficiency would be obtained by providing the police officer with direct access to the computer through a remote terminal in his vehicle. This is not a universal solution since we must consider the human limitations – the average patrolman is not a typist and he certainly cannot type while driving. However, there are situations where it would be advantageous to operate one-man-fixed or two-man-moving units with direct access to the computer.

System Description

Figure 1 shows the major functional parts of the simplest mobile terminal. An existing mobile radio would be equipped with a frequency-shift-keyed (FSK) tone encoder and decoder, keyboard, and printer. Operation would be the same as a voice-simplex push-to-talk radio system except for the substitution of printed messages. While such a simple system would meet the definition of a mobile computer terminal, a system based upon this approach would be far from satisfactory.

Certain improvements can make the system more usable. Optional features are designated by parentheses. It is essential that memory be provided for all or part of the message typed on the keyboard in order to conserve radio transmission time; otherwise, a mobile voice system working with a trained typist at the communication center interrogating the computer would be faster. Local printer copy provides a check on the message sent from the storage unit or, as a more complete check, from the transmitter. A second transmitter frequency is reserved for emergency traffic.

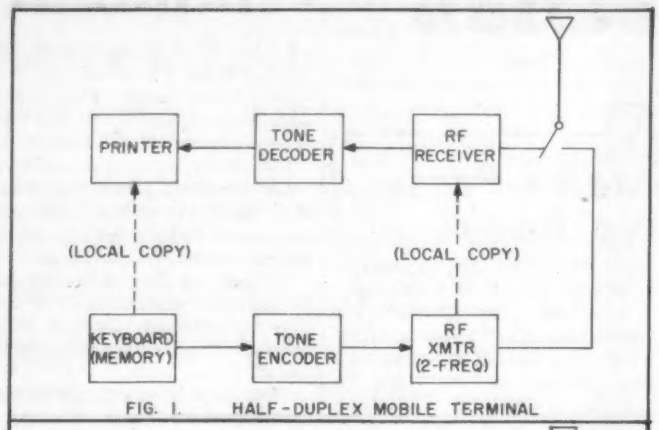


FIG. 1. HALF-DUPLEX MOBILE TERMINAL

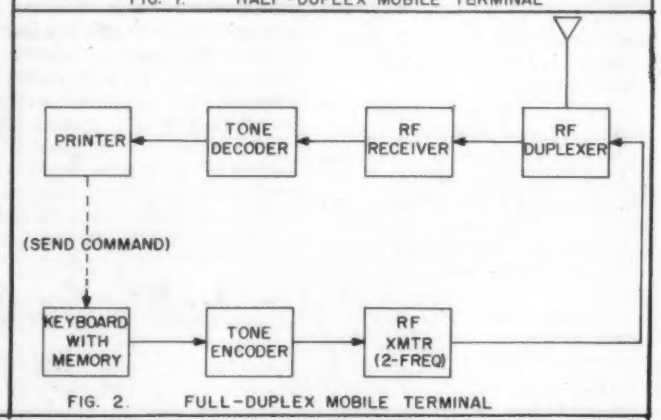


FIG. 2. FULL-DUPLEX MOBILE TERMINAL

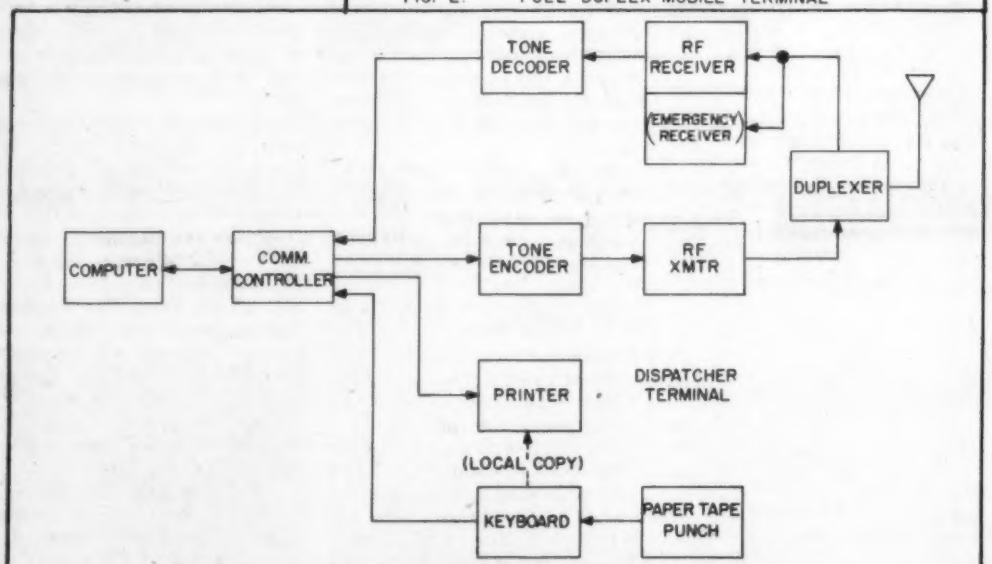


FIG. 3. COMPUTER COMMUNICATION TERMINAL

There still remains a serious problem – interference. Not only may two units attempt to transmit at the same time, but also, one mobile may not be able to receive another mobile on the opposite side of the city and thus may interrupt his message in progress. Attempts to add synchronization to the simple, half duplex, system result in undesirable time delays adding to the already limited message capability.

There seems to be no substitute for the full duplex, mobile terminal shown in Figure 2. A second radio frequency is used to permit simultaneous transmission and reception. Interference between mobile units is prevented by synchronization by computer command of all mobile data transmissions.

The method of system control can vary widely depending upon the particular communication controller and the operation of the particular law enforcement organization. One example will be given to help explain the operation. A mobile operator wishing to transmit an inquiry to the computer types the message and depresses a call pushbutton.

If an idle signal is being received, the mobile identification and stored message will be transmitted. If a busy signal is being received, the mobile unit will await the idle signal. Since there is the possibility that others are also waiting and there may be competition, only the mobile identification is transmitted. Acknowledgement is accomplished by either wait or send commands. The actual message is only transmitted after the particular mobile unit is activated by the send command.

The base station end of the man-to-machine interface is shown in Figure 3. The tone decoder and encoder are commonly called modems and provide the interface between the base station tones and the computer voltage or telegraph loop input/output. It is not necessary that the base station and the computer be at the same location, a point demonstrated by our tests described later. When the two devices are separated, either telephone lines can carry the tones to and from the modem located at the computer or telegraph lines can carry the loop current to and from the modem located at the base station.

The base station transmitter and receiver are connected to separate input/output channels of the communication controller which serves as the communications control between remote terminals and the computer. The more important functions of the controller are code recognition, code conversion, speed conversion, priority message handling, and basic message routing and switching.

In addition to communication between remote terminals and the computer, there is the need to consider the function of the dispatcher in a law enforcement communication system. This need varies from monitoring to printed intercommunication. In order to take advantage of the printed message capability of the system, the communication controller should also handle message switching between the dispatcher terminal and the mobile terminals.

Extension of the remote terminal through a radio path requires consideration of message timing. This is not a unique problem since it is similar to the situation where a message to a teletypewriter must be delayed until its motor is started. Typical mobile radio delay times are as follows:

Transmitter attack time	90
Receiver attack time	70
Receiver release time	90
Total – Milliseconds –	250

Receiver release time is a factor only when automatic acknowledgement from the mobile is provided. If the mobile printer must be turned on, this delay must also be included when transmitting to the mobile unit. The simplest method for accomplishing this delay at the computer is to program the message format with the necessary number of leading control and buffer characters to provide sufficient time (300 milliseconds typical) to actuate the transmission equipment and permit it to reach operating condition before receiving the actual message. If the mobile keyboard is equipped with memory, it can be hardwired to provide the delay before clocking the message from memory.

Test Installation

To demonstrate direct mobile-to-computer access, a test installation was made at Lynchburg, Va. A computer located in Bethesda, Md., 175 miles away, was used in the demonstration to fully test the combination of wire line and radio transmission. An ordinary telephone line between the two locations was terminated into a DigiNet data set which interfaced with the loop and tone equipment located in the MASTR Professional VHF base station at Lynchburg and a Datanet 30 communication controller at Bethesda. A Teletype Model 33ASR served as a monitor at the base station location.

A mobile installation, using standard equipment as much as possible, was established to prove the practicality of the concept. A MASTR Professional mobile radio completed the data transmission path to another Teletype Model 33ASR mounted in a van. While this teletypewriter is not designed for error-free operation and long life under this type vibration, operation was satisfactory on smooth roadways. AC power for the teletypwriter and

Police departments are showing considerable interest in mobile data terminals. The New York City Police Department has announced that it will install printers in 50 patrol cars next year.

This article is a condensed version of a paper on mobile data terminals presented at the Second National Symposium on Law Enforcement Science and Technology in Chicago April 16-18, 1968. The authors are David C. Brown, John D. Hawks, and Richard L. Larson, all of the General Electric Communications Products Division.

Computer terminals like this may be mounted in future police cars. Most of the circuitry is mounted underneath the car's control panel. The keyboard is deep because it contains the circuitry to provide coded, serial data output.

This mobile installation mounted in a van was used to prove the practicality of the mobile access concept.

test equipment was provided by a gasoline engine generator set mounted in a trailer towed behind the van.

While the use of equipment such as that is not under consideration for automobile use, ruggedized versions of this type have been considered for specialized vehicles – vans used for mobile check points, mobile command centers, etc. The generator would power other A-C operated equipment as well as the teletypewriter.

For automobile use, the equipment must be small and must operate from the automobile's electrical system.

Conclusion

Interest in and practicality for mobile-to-computer systems is evidenced in several areas:

Equipment is beginning to appear on the market for mobile use in data systems.

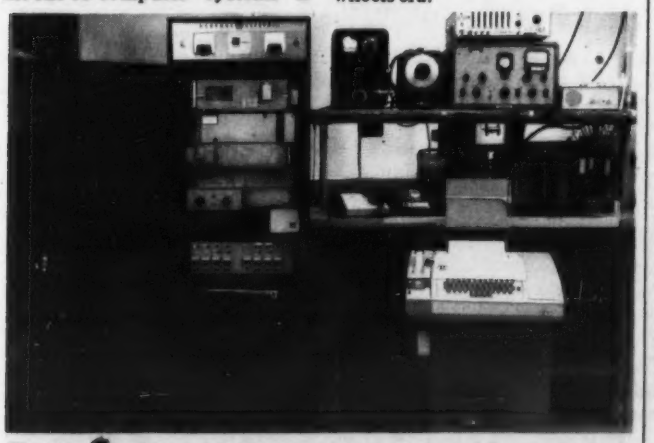
The FCC has shown an awareness for and is studying the assignment of new radio channels for data transmission.

Spectrum bandwidths are consistent with those now used for voice transmission.

Practical data transmission speeds are consistent with normally used teletypewriters and with remote computer terminal equipment.

Flexibility exists in the methods of system operation and design.

The potential of a direct mobile-to-computer system has become a reality. At last law enforcement agencies are on the threshold of the computer-on-wheels era.



The base station used in the experimental mobile access test.

Unit Makes Prints From CRT Displays

New Products

Hard copy of computer and video outputs can be generated with the automatic Rapcor, Series 725, system. The unit will record data and imagery and turn out 8-1/2" x 11" reproducible prints at an input rate of three to four sheets per second. Information displayed on a video monitor or CRT can be recorded. Operation is fully automatic. OPTO-mechanisms, Inc., 333 N. Broadway, Jericho, N.Y. 11753.

Data Modem Tester

Field testing of data modems can be done with a new test set developed by Milgo. The Model 110 evaluates data transmission systems using synchronous modems operating at any speed from 10 to 10,000 bits per second which are equipped for RS232B/CCITT V.24 interface, supplying their own clock. The unit is solid state throughout, with integrated circuits and silicon devices. The unit weighs 8 lbs. and measures 3 inches high and 12 inches wide. Milgo Electronic Corp. 7620 N.W. 36th Ave., Miami, Fla. 33147.

Punched Card Sorter

A punched card sorter, priced at $4300 ($95 per month rental), has been announced by NCR. The 408, designed for low volume applications, sorts 550 cards per minute into 13 pockets. The new model offers card counting and sort suppression, permitting combinations of categories to be closed to the sort, and the desired mix sent to a single pocket. National Cash Register Co., Dayton, Ohio 45409.

Graphics to Digits

An instrument that converts graphical information into digital form has been developed by Thomas L. Faul Associates and Coradi Ltd., Zurich, Switzerland. Designated Type DMB, this polar digimeter is claimed to be accurate and is expected to find extensive use in the fields of surveying, engineering, construction, electronic manufacturing, and tool manufacturing where there is need to convert graphical information into digital form. Thomas L. Faul Associates, Inc., 27 Fannell St., Skaneateles, N.Y. 13152.

Disk Pack Carrying Case

A new disk pack case, designed to accommodate any standard interchangeable packs now in use, is made of lightweight, durable, vacuum formed plastic material. The case is formed in a ridged design to permit nesting. Resilient plastic foam adjusts to minor differences in diameter between packs. Height accommodation is through addition or removal of foam pads at the bottom of the case. Tab Products Co., 633 Battery St., San Francisco, Calif. 94111.

Magnetic Core Memory

First deliveries have been made of a new magnetic core memory, Model DC-51, priced at $500 each. The unit is compact, measuring 7-1/2" x 14-1/2". The cores, address and data drive circuits, sense circuits, and timing and control logic are mounted as a single printed circuit package. Address and data registers are optional and are contained on an additional printed circuit board. The unit was designed for applications requiring inexpensive, non-volatile storage such as CRT display refresh, data transmission buffering, and data terminals. Datacraft Corp., 776 N.E. 40th St., Ft. Lauderdale, Fla. 33307.

DP Binder

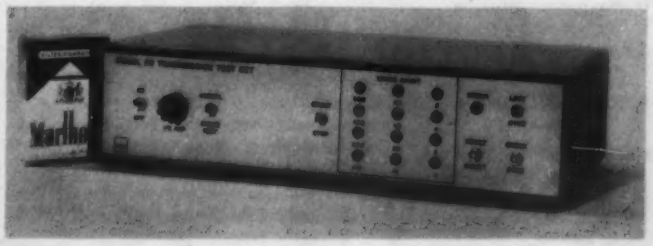
A new data processing binder, P7P Accodata, is designed to store heavy volume daily reports. Covers are constructed of lightweight pressboard and are secured with a datapost fastener. Compressibility is achieved by placing a locking nut over the one-piece datapost, pressing forms down and fastening them securely. Covers are available in assorted colors. Dataposts are included with each binder, packed 50 per poly bag, two poly bags in each box. Acco, 5150 Northwest Highway, Chicago, Ill. 60630.

Computer Aid

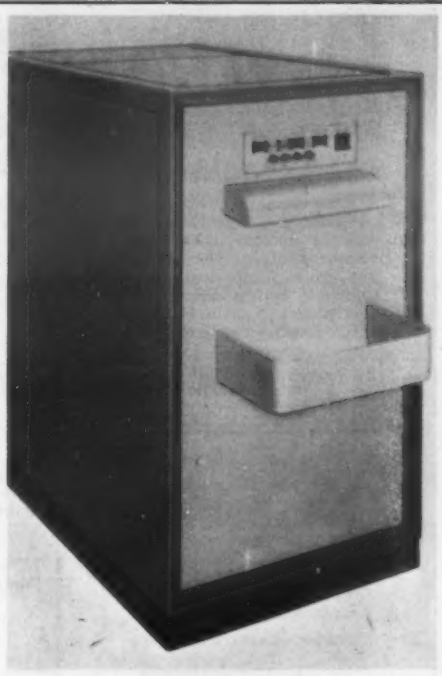
An insertable, transparent plastic label holder, Bind-X, has been designed for identifying stacks of computer printout data. A tab joined at right angles to the label holder can be inserted into the sheets which are to be identified. The label holder can be used temporarily or it can be affixed permanently by moistening the adhesive coating on the tab. Available in widths from 3/8 inch to 2-1/2 inch in standard 6 inch lengths and five transparent colors. Cel-U-Dex, Inc., P.O. Box 84, New Windsor, N.Y. 12550.

Adjustable Chair

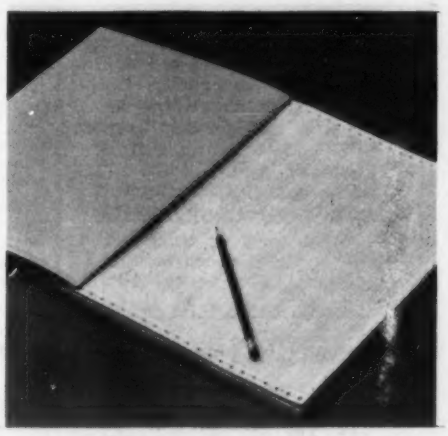
Designed for computer room use, a chair which floats on a column of pressurized air can be elevated to any position 17-5/8 inches to 25 inches from the floor. The seat and back will rotate a full 360 degrees with no shifting of stool position or height. The back adjusts laterally for backward or forward action. Emil J. Paidar, 1120 N. Wells St., Chicago, Ill. 60610.



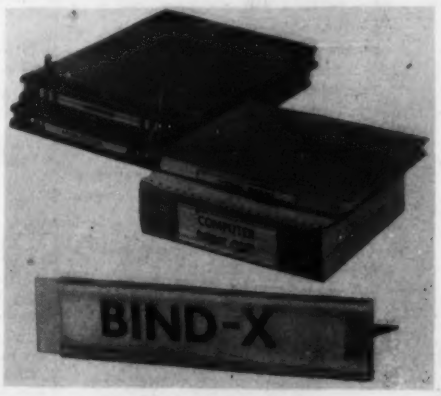
Milgo Transmission Test Set



Rapcor Hard Copy Maker



Datapost Printout Binder



Bind-X Label Holders

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Computers Blamed In Voting Delays

By Otto Franz
CW Correspondent

Information system designers, long familiar with Murphy's Law ("If anything can go wrong, it will."), saw an interesting demonstration of the law in the recent California primary vote counting. The goofs, which inspired anti-computer editorials, hearings by a legislative investigating body for the State of California, and general public criticism, included an error in an instruction manual, an incompatible Fortran compiler, delays due to traffic jams, and card readers slower than estimated.

Los Angeles: The hundreds of thousands of punched cards had to be transported as much as 20 or 30 miles from precincts to computer centers. Freeway traffic plus traffic jams which developed outside the few computer centers caused delays of up to two hours. Counting also fell behind schedule because a card reading speed of 600 per minute was expected, while the actual rate was 500.

Fresno: The Fortran compiler used refused to accept the punched cards. Nonstandardization of Fortran compilers appears to have been the villain (see below).

San Francisco: An instruction booklet which explained the optical scanning system to precinct workers had illustrations which incorrectly showed how to enter figures on the tally sheets. More than half, and perhaps two-thirds, of the tally sheets were rejected, and each rejected sheet had to be corrected before it could be tallied by the computer system.

The editorial in the San Francisco Chronicle, "Vote-Count Fiasco," was typical of the newspaper comment: "... These marvelous machines that man has created are marvelously punctilious, rigid, and perverse. They can't temporize and adjust like people, and they suffer a nervous breakdown over the merest mishaps that the least talented human being instinctively sets right. They are aloof from all human relationships.

"Yet men now rely on the brass bound decisions of these machines in matters great and small – decisions no better than the data that somebody feeds into them. This is a clear and dangerous abdication of man's ability and duty to think for himself and make his own decisions – an abdication possibly responsible for many of our troubles."

Fortran IV Differences Blamed for Vote Delay

FRESNO, Calif. – A difference between two Fortran IV compilers currently is believed to have been the problem that caused the delay in vote tabulation here during the California primary June 4.

In the system concerned, the voter inserts a card into a marked slot in a portable frame. After examining a sample ballot attached to the frame, the voter opens a book ballot to the first page, and using the stylus provided, punches out the pre-scored hole in the computer card opposite the candidate of his choice.

After balloting, the voter inserts the card into an envelope and places it in the ballot box. Write-in selections may be indicated on the envelope.

Different Compilers

In the Fresno case, the program was written in Fortran IV, then compiled and tested on one make of machine. Later it was compiled by the Fresno authorities on a different system, and appeared to be working well.

On election day, however, the translation tables in the program were apparently overwritten each time a card was processed, and a "computer system failure" cry went up.

Once diagnosed, the problem was quickly solved by punching the translation tables into all the input cards.

"To date, it is not known why these tables were being destroyed," Rod Hall of the Seismograph Service Corp. in Tulsa, Okla., which supplied the Seiscor 240 Voter Recorders used, told *Computerworld*. The unanimous opinion of those familiar with the system was "that the problem was in either the compiler software or the program," he said.

It Worked Before

"Be that as it may, the same program has been used in other elections without difficulties, both before and after Fresno," he said. "Two examples were April 30 in . . . Newton, Mass., and June 17 in Gorham, Maine."

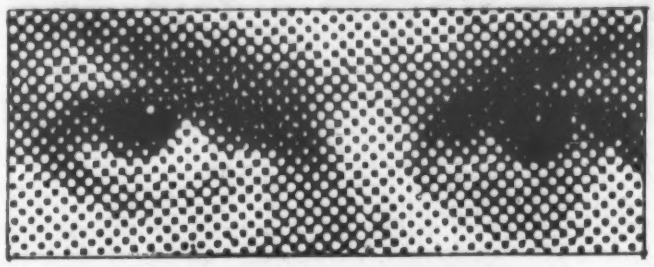
Computer voting had been used by Fresno County before, and had received praise from Fresno County Elections Supervisor, Richard S. Jansen, who said that the county will use computer voting for the 1968 general elections.

"The punched card system of voting works beautifully and we had no problems at the precinct level or with voter acceptance," he said following the election. "The whole problem hinged on the fact that the program was not written properly."

Jansen identified the computer used as being manufactured by Honeywell. Jansen said the county has no trouble with the computer.

"The prime goal in using computer equipment and the punched card system is saving money," Jansen said. "In the recent June primary, we saved nearly $60,000 compared to the costs of the November 1966 general [election] in election officers' salaries and polling place rents alone."

NOTICE TO ADVERTISERS



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NOTED AT CHANGES

NRMA Conference Slated for Canada

NEW YORK – The 10th annual EDP conference of the National Retail Merchants Association will be held Oct. 6-10 in Montreal, Canada, this year. The selection of Montreal was not merely part of a policy of moving around – the last two conferences have been in Washington and New Orleans – but also was made to recognize the substantial interest Canada has in EDP. The Retail Council of Canada has cooperated in the arrangements.

Papers for the conference will deal with many of the phases of the use and abuse of computers in retail merchandising. The problem of fraud will be discussed by Stanley Halper, sales director of Leidesdorf & Co., while the respective advantages of polling and communications versus batch processing will be brought out by C.G. Abbott of Arthur Andersen & Co.

The keynote speech, "Control in Transition," will be given by Harry Gray of Litton Industries. All in all, there will be approximately 40 concurrent workshops, with a general session each day.

For details of the conference, write: Retail Research Institute, NRMA, 100 West 31st St., New York, N.Y.

WORKSHOPS AND SESSIONS

TOPIC	SPEAKER
Control in Transition (Keynote Address)	Harry J. Gray, Litton Industries
Analysis of a Retail Distribution System Utilizing a Computer Model (General Session)	Robert Green, S.H. Kress; Harry Schreiber, Jr., Collin W. Scarborough, and Richard L. Fleischer, all of Peat, Marwick, Mitchell & Co.
Introduction to Data Processing	Stanley Halper, S.D. Leidesdorf & Co.
The Profitabie Utilization of EDP in Sales Promotion and Marketing	Edgar M. Jacobs, Aldens, Inc.
Systems Development in Complex Installations	William D. Power and Donald R. Wood, of Touche, Ross, Bailey & Smart
Putting Computers to Work	Michael Levokove, S.D. Leidesdorf & Co.
A Case Study (The Popular Dry Goods Company)	Herbert M. Schwartz, Popular Dry Goods Co.
Retail Data Processing Applications	Martin Star, S.D. Leidesdorf & Co.
Fraud and the Computer	Stanley Halper, S.D. Leidesdorf & Co.
A Case Study (Reitman's, Montreal, Canada)	I. Salem, Reitman's, Inc.
Unique Approaches to the Use of Terminals	John C. Quinn, Ticket Reservation Systems; J.B. Hempstead, Air Traffic Conference of America
Polling and Communications Versus Batch Processing	C.G. Abbott, Arthur Andersen & Co.
Accounts Receivable Processing for the Middle Size Retailer	John A. Putney, Jr., R.S. Topas & Co.; Allan Vesley, Sperry & Hutchinson Co.

EDP Education Problems High on ACM's Agenda

LAS VEGAS, Nev. – Will the high school student of tomorrow be required to take courses in computers? Will data processing be such an integral part of our lives by 1980 that training in computer usage will be as necessary as learning to drive is today?

A special program has been scheduled to discuss these and other educational issues during the 1968 Association for Computing Machinery Conference and Exposition here Aug. 27-29.

Fred Gruenberger, associate professor of accounting at San Fernando State College, will lead the discussion by 13 experts in the fields of education and data processing.

"We have chosen representatives with specific points of view regarding such things as how should computer technology be taught in schools, what student interest groups should receive training, how extensive should the instruction be, and what materials should be used," Gruenberger said.

The session, entitled "Education for the Computer Revolution," is the third in a continuing workshop dealing with methods and purposes in data processing education. A summary of the views of the group will be presented at the conference along with a film entitled "It's Your Move", which documents a workshop for high school mathematics teachers conducted by the ACM.

In addition, two of the 29 technical sessions at the conference will be devoted to computer aided instruction (CAI). Peter Calingaert of the University of North Carolina will moderate a panel on "A Comparison of CAI Languages."

One of the highlights of the conference will be an "International Computer Discussion Panel" moderated by Dr. Walter Bauer, president of Informatics, Inc. Eight panelists, four from the United States and one each from Japan, France, Great Britain, and Russia, will discuss problems and trends of the computer industry on an international scale.

Richard B. Blue, of TRW Systems Group, is general chairman of the ACM '68 Conference.

COMPUTERWORLD

financial

MDC Buys MPI, Merges With Computer Services

PHILADELPHIA, Pa. – Management Data Corp. has announced stockholder approval of a merger with Computer Services, Inc. in Cherry Hill, N.J. Under the plan, each share of CSI common stock will be converted into 1.2285 shares of MDC common stock.

MDC has also announced the acquisition, on a pooling of interests basis, of Management Psychologists, Inc. in Philadelphia, a closely held firm of industrial psychologists, for 13,000 shares of MDC common stock plus an agreement for the transfer of an additional 12,000 shares of MDC common stock contingent upon MPI's future earnings.

MPI has been operating in the field of organization development for many years, and offers a full range of personnel services, in-plant training, and executive consulting.

Computer Services, formed three years ago, is a computer service company serving commercial, professional, and municipal clients in several states.

MDC is engaged in the leasing of data processing equipment.

MDC President Gilbert N. Zitin said that a wholly owned subsidiary, Management Services International, Inc., has been formed to assume the assets and liabilities of CSI following the merger.

Acquisitions

Wang Laboratories Buys Philip Hankins & Co., Inc.

TEWKSBURY, Mass. – Wang Laboratories, Inc. has acquired, through a wholly owned subsidiary, "substantially" all of the assets, subject to liabilities, of Philip Hankins & Co., Inc., Arlington, Mass., in exchange for 101,720 shares of Wang common stock.

Philip Hankins is engaged in computer consulting and programming and operating a computer service center.

Wang is a designer and manufacturer of electronic calculators and small computers.

Philip Hankins's business will be continued by Wang's wholly owned subsidiary, Philip Hankins, Inc.

West Coast Drug Company To Buy Georgia Data Corp.

BEVERLY HILLS, Calif. – Daylin, Inc., a multi-management company engaged primarily in the retail drug field, has announced the acquisition of the Georgia Data Corp. in Savannah, Ga., in an exchange of stock of undisclosed proportions.

Georgia Data, which will continue under its present management, is a data processing service organization.

Becton-Dickinson, Spear Sign Acquisition Contract

RUTHERFORD, N.J. – Becton, Dickinson and Co. has announced the ratification of a contract by its board of directors and the board of directors of Spear, Inc. in Waltham, Mass., to acquire the assets of Spear, through a wholly owned subsidiary, for 80,900 shares of Becton, Dickinson common stock.

The contract is subject to the approval of Spear stockholders.

Spear is a manufacturer of specialized computer systems with primary emphasis upon the automation of hospital based and independent clinical laboratories.

Computer Service Company Acquired by Its President

ROCHESTER, N.Y. – Rochester Computer Service, Inc. has announced a change of ownership, with Dr. Harold E. Paddock, the president, acquiring a majority interest.

The firm, the oldest independent data processing service bureau in the area, has recently upgraded its computer programs to offer better service both to existing and potential customers, Paddock said.

Loew's Drops Federal Suit To Block CDC-CCC Merger

NEW YORK – Loew's Theatres, Inc. has dropped the suit it filed in U.S. District Court here in June in its efforts to block the proposed merger of Commercial Credit Corp. of Baltimore, Md. – which it was trying to take over – and Control Data Corp. of Minneapolis, Minn.

Earlier this month, Loew's conceded defeat in its efforts to take over CCC through a tender offer (CW, July 10).

CCC had been fighting the attempted Loew's take-over and has recommended the CDC-CCC merger to its stockholders instead. CCC and CDC stockholders are scheduled to meet separately Aug. 15 to vote on the merger.

The Loew's suit charged that the defendant violated Security and Exchange Commission rules by denouncing the Loew's offer without filing letters of denunciation with the SEC; that Kidder, Peabody & Co., a New York securities firm, put out a public bulletin in favor of the CDC-CCC merger plan without disclosing that Albert H. Gordon, Kidder-Peabody chairman, is also a CCC director, and that the bulletin did not disclose that Kidder-Peabody acted as the finder for CDC's proposed purchase of CCC or that Kidder-Peabody had acted in the past as the principal financial banker of CCC.

Among other demands, the suit asked for $25 million in damages if the Loew's exchange offer was thwarted.

Largest Stockholder

Prior to June 13, when the Loew's tender offer went into effect, Loew's claimed to have purchased 1,000,700 of CCC's 10,538,029 common shares on the open market. Loew's has not said how many shares it now owns through the tender offer, although it did offer to return any tendered shares on request if it failed in its take-over bid.

Loew's Chairman, Laurence Tisch, said that Loew's, as the single largest CCC stockholder, does not see any point in trying to block the CDC-CCC merger any longer, and that the recent price rise in CCC stock has eliminated any "direct monetary damage" to Loew's. Loew's paid an average of $32 a share for the stock it bought on the open market before the tender offer. The price has since doubled.

GE 2nd Quarter, 1st Half Earnings Down; Sales Up

NEW YORK – General Electric's second quarter income fell to $82.5 million ($.91 a share) from the record $96 million ($1.06 a share) in the second quarter of 1967. First half income fell to just under $153 million ($1.70 a share) from $168.7 million ($1.87 a share) in the first half of 1967.

GE President Fred J. Borch blamed the declines on provisions for the 10% federal income tax surcharge and "the heavy costs of developing the nuclear energy and information systems businesses."

First half sales were up 9% to $4 billion, with second quarter sales up 8% to nearly $2.1 billion.

GE said provisions for the tax surcharge amounted to $.08 a share in the first quarter and $.10 a share in the second quarter.

"General Electric continues to support a federal fiscal policy combining a tax increase and substantial reductions in governmental expenditures, as more desirable than continued inflation and deterioration in the U.S. international monetary position," Borch said.

"Although it is anticipated that losses will continue in 1969, the largest adverse impact is expected to be on earnings booked in 1968," Borch said.

RCA 2nd Quarter, 1st Half Income Up; 1st Half Sales Are $1.5 Billion

NEW YORK – RCA's second quarter profits increased 13% to $24.8 million ($.37 a share) from the year earlier figure. First half earnings increased to a high of $63.5 million ($.97 a share), up 8.2% from 1967 first half earnings.

RCA President Robert W. Sarnoff, in making the announcement, said that first quarter sales jumped to a record of nearly $720.7 million from $635.6 million during the first quarter of 1967 and that first half sales reached a record of $1.5 billion compared with the year earlier figures of $1.4 billion.

The second quarter and first half figures reflect provision for the recently enacted 10% federal income tax surcharge, the company said.

Too many imponderables are in the economic outlook to make any precise forecasts for the rest of the year, Sarnoff said, but barring any serious changes for the worse in the areas of balance of payments or inflation, the economy should grow, and RCA's sales and profits should set highs for the seventh consecutive year.

Domestic bookings of RCA computers in the second quarter 1968 increased at a greater rate than the estimated growth rate of the rest of the computer industry, he said.

Randolph to Ask Permission to Be Holding Company

NEW YORK – Randolph Computer Corp. will ask its stockholders to approve a change in the corporate structure to permit the company to act as a holding company. A special stockholders meeting tentatively has been scheduled for Sept. 26.

If the action is approved, the company's computer leasing and data processing services would each be operated as separate subsidiaries, according to Randolph President John M. Randolph.

Executive Vice President John G. Arbour said that while the company is not currently negotiating for such expansion, the change would give the parent company "more flexibility" in expanding into other businesses. When the company does seek specific types of operations, they will probably be in line with the company's present finance and data processing businesses, Arbour said.

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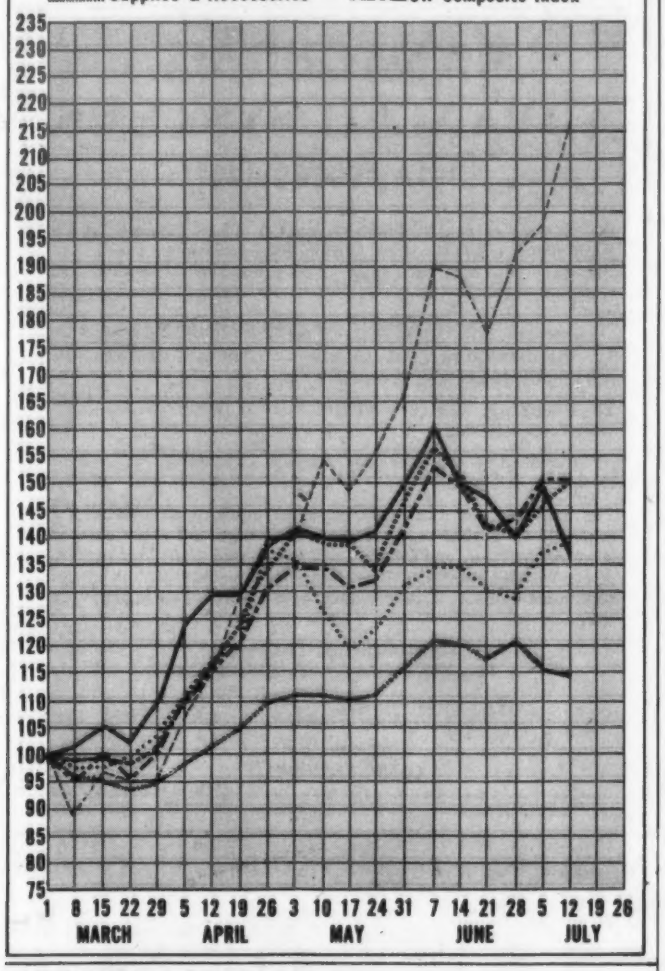
Computer Stocks Trading Index



CW Stock Index Is Unchanged

Computerworld's Computer Stock Index closed July 12 at 151.4, virtually unchanged from the week before, while the Dow-Jones industrial average closed up 2.1% at 922.46. Volume on the New York Stock Exchange for the four day trading week was 68,503,850 shares compared with 39,022,201 shares traded during the previous week when the market was closed both July 4 and 5. Among the stocks listed in the *Computerworld* stock table, gainers and losers were even.

Among the computer stocks, the Computer Systems and the Supplies & Accessories sectors were off, the Computer Systems sector by a significant 6.2%. The Software and EDP Services sector showed a 9.47% gain.

But, as market wizards have been saying all along, performance is where you find it, and during the week it was being rediscovered in the blue chip sectors where exceptional price gains have been few and far between. Analysts think that the swing back to quality issues will last longer than previous swings, so that even if the market slows in the coming weeks as traders realize some of their profits, coming weeks should show further advance.

The feeling of basic change seems to be caused by growing doubt about growth-stock expectations, not only the accepted risks of high price-to-earnings valuations on the more speculative issues, but also the sustainable rate of earnings expansion.

In the future, earnings are expected to continue climbing, but they are not expected to exceed the rate of growth in sales as they have in the past.

New Highs, Lows

Twelve stocks reached new highs, one stock rose to a previous high, and one stock declined to a new low.

In the Software and EDP Services sector, Matrix Corp. was off 8.82% to 17, while in the Leasing sector, DPA regained a high, closing up 4.73% at 19-3/8.

In the Peripherals and Subsystems sector, Information Displays closed up 20.93% at 26, Photon was up 17.11% to 130, and Recognition Equipment was up 22.98% to 99.

In the Supplies and Accessories sector, Nashua Corp. was up 9.34% to 76-1/8, and Reynolds was up 9.8% to 56.

In the Software and EDP Services, Advanced Computer Techniques was up 33.33% to 25, Applied Data Research was up 22.22% to 33, Brandon Applied Systems was up 11.11% to 20, and National Computer Analysts was up 21.27% to 57.

Among the leasing companies, Boothe Computer closed up 8.57% at 57, Dearborn Computer closed up 25.53% at 59, and Leasco was up 10.95% to 107-5/8.

COMPUTER STOCKS: TRADING SUMMARY

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	COMPUTER SYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	183 3/8	220–157	214 7/8	• Burroughs	+ 13 7/8	+ 6.90	+ 31.12
NYSE	67 3/4	110– 59	59 7/8	Collins Radio	– 2 5/8	– 4.20	– 11.63
NYSE	101 1/2	174– 95	164	• Control Data	+ 3	+ 1.83	+ 61.53
AMSE	102	160– 96	143	• Digital Equipment	– 1 3/4	– 1.22	+ 40.20
NYSE	87 1/4	100– 84	86	General Electric	+ 1/2	+ 0.58	– 1.50
NYSE	60	91– 69	76 1/4	Hewlett-Packard	– 4 1/4	– 5.57	+ 27.08
NYSE	99 1/8	144– 89	127 7/8	• Honeywell	– 2 1/8	– 1.66	+ 37.31
NYSE	269 1/2	375–260	264 3/4	• IBM	– 3 1/4	– 0.82	+ 22.96
NYSE	103 7/8	153– 99	137	• Nat. Cash Register	+ 5/8	+ 0.46	+ 31.89
NYSE	46 7/8	56– 46	47 3/4	RCA	+ 3/8	+ 0.79	+ 1.87
NYSE	39 1/8	53– 38	41 1/2	Raytheon	– 3/8	– 0.90	+ 6.07
OTC	22 1/2	66– 20	55	• Scientific Controls Corp.	+ 6	+10.91	+100.00
NYSE	78 3/4	114– 72	96 5/8	• Scientific Data	– 5 1/2	– 5.69	+ 22.69
NYSE	45	63– 42	48 1/2	• Sperry Rand	– 2 1/2	– 5.15	+ 7.71
AMSE	22 1/2	39– 20	36 1/2	• Systems Engineering Labs.	– 1 7/8	– 5.14	+ 6.22

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	PERIPHERALS & SUBSYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	98 3/8	91– 62	84 1/4	Addressograph-Multigraph	– 3 1/4	– 3.71	+ 44.33
OTC	21	68– 45	67	Alphanumeric	– 4	– 5.63	+219.05
NYSE	29	37– 28	31 1/2	Ampex	– 1 3/8	– 4.37	+ 8.62
OTC	17 1/4	27– 16	19 3/4	Bolt Beranek & Newman, Inc.	+ 1 1/2	+ 7.89	+ 14.49
NYSE	13 1/2	20– 12	19 1/8	Bunker-Ramo	+ 5/8	+ 32.67	+ 41.62
AMSE	32 1/8	50– 27	45 1/2	• Calcomp	– 2 3/4	– 5.70	+ 41.62
OTC	12	17– 10	16 1/2	Computer Equipment	+ 1/4	+ 1.52	+ 37.50
OTC	15 1/4	23– 13	18 5/8	• Data Products	– 1	– 5.10	+ 22.13
OTC	19 1/4	27– 16	24 3/4	• Digitronics	+ 3 3/4	+ 1.79	+ 28.57
OTC	30	57– 32	44 3/4	• Electronic Memories	+ 2 3/4	+ 6.54	+ 14.73
OTC	10	20– 9	17	• Fabri-Tek	—	—	+ 70.00
OTC	34	71– 28	66	Gerber Scientific	+ 2	+ 3.13	+ 94.12
OTC	12 1/2	24– 10	26	Information Displays	+ 4 1/2	+ 20.93	+108.00
AMSE	16 7/8	52– 14	47 7/8	Milgo Electronics	– 2 7/8	– 5.67	+183.70
AMSE	115 1/8	217–108	204 1/4	• Mohawk Data Sciences	– 3 3/4	– 1.80	+ 77.41
OTC	74	139– 71	110	• Optical Scanning Corp.	– 7	– 5.94	+ 48.61
OTC	72	130– 64	130	Photon	+ 19	+ 17.11	+ 80.20
AMSE	25 5/8	38– 20	32 3/8	• Potter Instrument	– 1 1/8	– 3.36	+ 26.34
OTC	40 1/4	99– 38	99	• Recognition Equipment Corp.	+ 18 1/2	+ 22.98	+145.93
AMSE	16	29– 14	24 5/8	Rixon Electronics	– 1/8	– 5.08	+ 53.96
NYSE	46 1/8	66– 42	52 1/4	Sanders	– 3 1/4	– 6.88	+ 13.26
OTC	47	155– 53	90	Sanders Scan-Data	+ 10	+ 12.50	+ 91.49
OTC	40 1/2	51– 35	49	• Tally Corp.	+ 3 1/2	+ 7.14	+ 20.96
NYSE	242 1/4	321–229	266	Xerox	– 5	– 1.99	+ 22.15

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SUPPLIES & ACCESSORIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	48 1/2	64– 41	57	• Acme Visible	+ 2	+ 3.63	+ 17.53
NYSE	20 1/2	32– 19	23 7/8	Adams-Millis	– 2	– 8.38	+ 16.46
OTC	13 5/8	19– 13	19 3/4	• Baltimore Business Forms	+ 1/8	+ 0.64	+ 44.90
AMSE	27	44– 21	35	• Barry Wright	– 4 3/4	– 11.98	+ 29.62
OTC	31 1/4	40– 26	36	Data Documents	+ 1/4	+ 0.67	+ 21.61
OTC	27 1/4	38– 26	33 1/2	• Ennis Business Forms	+ 1/2	+ 4.82	+ 22.93
NYSE	94 1/8	119– 81	100	• 3M Company	—	—	+ 29.96
NYSE	68	83– 49	67 5/8	• Moore Corp.	– 3 1/4	– 4.61	+ 16.51
OTC	27 1/4	32– 25	30 1/2	• Moore Business Forms	– 5/8	– 1.99	+ 11.02
NYSE	67 1/4	76– 47	76 1/8	Nashua Corp.	+ 6 1/2	+ 9.34	+ 32.96
OTC	31 1/4	66– 30	56	Reynolds & Reynolds	+ 5	+ 9.80	+ 62.31
OTC	34 1/2	35– 24	26	• Standard Register	+ 3/4	+ 2.97	– 24.54
NYSE	37 3/4	44– 30	31 3/4	• Usco	– 3/8	– 1.16	– 15.90
AMSE	14 1/4	22– 13	17	Wabash Magnetics	– 3/8	– 2.16	+ 17.24
OTC	25 3/4	36– 24	29	• Wallace Business Forms	– 1/2	– 1.69	+ 12.62

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SOFTWARE & EDP SERVICES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	7 1/2	25– 7	25	Advanced Computer Techniques	+ 6 1/4	+ 33.33	+233.33
OTC	17	33– 14	33	• Applied Data Research	+ 6	+ 22.22	+ 94.18
OTC	15 1/2	24– 16	18	• Aries	– 2	– 11.11	+ 3.23
AMSE	47	68– 42	59 1/2	Automatic Data Processing	+ 3 3/4	+ 6.30	+ 26.60
OTC	4 1/2	20– 3	20	• Brandon Applied Systems	+ 2	+ 11.11	+344.19
AMSE	22 7/8	43– 21	26 1/2	Computer Applications	+ 3/8	+ 1.49	+ 11.47
OTC	5	13– 7	12	Computer Environments	+ 1/2	+ 4.17	+140.00
OTC	30	60– 24	59	Computer Network	+ 1	+ 1.69	+ 96.50
AMSE	40	64– 36	60 7/8	• Computer Sciences	– 5/8	– 1.02	+ 52.22
OTC	39	62– 35	37 1/2	• Computer Usage	– 2	– 5.06	– 3.90
AMSE	30 1/2	61– 36	55 3/4	• Computing and Software	+ 2 1/4	+ 4.04	+ 82.79
OTC	12 1/2	20– 9	14 3/4	• Digitek	+ 1	+ 7.27	+ 18.00
AMSE	38 3/8	52– 26	38 1/2	Electronic Computer Prog. Inst.	– 1 1/8	– 2.84	+ 0.32
OTC	35	66– 32	60 1/2	• Informatics	– 1/2	– 0.80	+ 72.29
OTC	21	26– 17	17	Matrix Corp.	– 1 1/2	– 8.82	– 19.05
OTC	11 1/2	57– 8	57	• National Computer Analysts	+ 10	+ 21.27	+395.65
AMSE	31	45– 26	43	Planning Research	+ 2	+ 4.87	+ 38.71
OTC	9	15– 8	12 3/4	Software Systems	– 1/4	– 1.92	+ 41.67
OTC	20 1/2	22– 12	13	TBS Computing Centers, Inc.	+ 3/4	+ 6.12	– 36.59
OTC	63	158– 57	152	• University Computing	+ 15	+ 9.87	+141.27

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	LEASING COMPANIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	18	64– 18	57	Boothe Computer	+ 4 1/2	+ 8.57	+216.66
OTC	99 1/4	28– 18	27 1/2	Chandler Leasing	– 3/4	– 2.66	+ 42.68
OTC	4 1/4	8– 4	8 1/4	Computer Exchange	– 3/4	– 8.33	+ 94.11
AMSE	25 1/8	38– 21	38 1/2	• Computer Leasing	– 1 1/8	– 3.04	+ 13.43
OTC	12 1/4	19– 11	16 1/2	• Cyber-Tronics	– 5/8	– 4.30	+ 26.53
AMSE	106 5/8	184– 54	123 1/2	• Data Proc. Financial & General	– 8 7/8	– 6.70	+ 15.82
OTC	12 1/2	17– 9	10 1/8	Datronic Rental	+ 3/8	+ 3.85	– 19.00
OTC	20	59– 18	59	Dearborn Computer	+ 12	+ 25.53	+195.00
OTC	13 1/4	19– 12	19 3/8	• DPA, Inc.	+ 7/8	+ 4.73	+ 46.22
AMSE	28 3/4	43– 27	37 3/4	• Greyhound Computer	– 3/4	– 1.95	+ 31.30
AMSE	26 1/8	99– 36	66 1/2	Gyrex Equipment Leasing	+ 10 1/4	+ 22.66	+ 97.19
AMSE	49	107– 46	107 5/8	• Leasco	+ 10 5/8	+ 10.95	+119.61
OTC	5	16– 5	13 1/4	Lectro Computer Leasing	+ 1 1/2	+ 12.76	+165.00
AMSE	45 7/8	94– 41	82	• Levin-Townsend Computer Corp.	– 1 3/4	– 2.06	+ 80.82
OTC	10 1/2	16– 7	10 1/2	• LSC Data, Inc.	+ 1/4	+ 2.44	—
OTC	10 7/8	16– 10	13 3/8	• Management Assistance	+ 2 3/8	+ 21.59	+ 22.98
AMSE	41 5/8	63– 25	40 7/8	National Equip. Rental	– 2 5/8	– 6.03	– 1.90
AMSE	39	64– 35	52 1/2	• Randolph Computer Corp.	– 1 3/4	– 3.23	+ 38.16
OTC	10 1/2	42– 10	36	System Capital Corp.	+ 3 1/2	+ 10.77	+242.92
AMSE	10 7/8	18– 10	16 1/2	U.S. Leasing	– 1/8	– 0.75	+ 51.72

*Companies included in Computerworld's stock trading index for each sector.

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Safety Coordination Studied

SUNNYVALE, Calif. – Systems analysts are completing a plan to help make Kansas highways safer.

Under the National Highway Safety Act of 1966, Kansas awarded Lockheed Missiles & Space Co. here a $22,000 contract to assist the state in developing a program to cut traffic deaths and injuries.

In 1967, the secretary of transportation issued 16 national standards for highway safety. They embrace areas of concern including vehicle inspection, traffic court procedures, drunken driving laws, traffic records, emergency medical services, motorcycle safety, and highway design. These standards are the basis of the projected program.

"We're analyzing the current functions of Kansas' state and local agencies with respect to safety," says Walter A. Diehm, Lockheed project manager. "Our job is to make recommendations to Gov. Robert Docking and his representatives regarding organization needed in the safety coordinator's unit, and to suggest means of implementing the safety standards."

A major area of emphasis in the study is the "interface" among the many legal jurisdictions within Kansas which have impact on the highway system. Road design, law enforcement, driver licensing and other government functions – each bearing in some way on safety – are being examined as parts of a whole.

Lockheed's systems approach, used successfully in many kinds of analysis and planning tasks in the past, is to break down a large problem into its small, basic components, then fit them together in a new, constructive way. This approach is being applied to Kansas' overall highway safety situation.

The final report will recommend ways in which police, highway patrolmen, courts, planners, educators, and legislators can work together to implement the 16 federal safety standards.

calendar

July 22-26, San Francisco, Calif. – "Iterative Analog Computation." Contact: Electronic Associates, Inc., P.O. Box 582, Princeton, N.J.

Aug. 5, Edinburgh, Scotland – IFIPS Congress '68. Contact: AFIPS, 345 E. 47th St., New York, N.Y. 10017.

Aug. 19-23, Boston, Mass. – "Time Sharing." Contact: R.F. McIntosh, Computer Learning, 6201 Leesburg Pike, Falls Church, Va. 22044.

Aug. 20-23, Los Angeles, Calif. – Western Electric Show and Convention (WESCON). Contact: WESCON, 3600 Wilshire Blvd., Los Angeles, Calif.

British Board Refuses IBM 10% Rate Hike

LONDON, England – IBM's British subsidiary, IBM United Kingdom Ltd., has been refused permission to raise its rental rates by 10% by the British Prices and Incomes Board.

But, the board did approve a 7% increase for new computers and a 5% increase for models more than four years old.

While the board's recommendations are not legally binding, companies usually follow its rulings.

The company had announced the 10% rate hike in computer rental charges at the first of the year, but withheld applying them until the board made its report.

IBM is believed to control 35% to 40% of the British computer market.

Service Bureau Aids Oil Dealers

NEW YORK – Fuel oil dealers can computerize their businesses by using a new service offered by Computech Inc., a subsidiary of United Data Centers Inc.

Known as Computafuel, the system was perfected after a five year field study, the company said.

According to the company, in tests the service has reduced clerical costs by as much as 80% and reduced delivery requirements as much as 35%.

In addition to preprinted delivery tickets with name, address, and special delivery instructions and the degree day projection for each customer, daily services provided by the Computafuel system include runout warning reports, driver's reports, cash reports, sales and delivery reports, file maintenance proofs, and selling price and discount summary.

Computafuel also provides, on a monthly basis, statements, aged analysis of accounts receivable, budgets, and ledger cards.

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Ability of Optical Readers Expanded

WHITE PLAINS, N.Y. – IBM is adding full alphabet (upper case only) reading capability to its $126,000, 1287 Optical Reader in the second quarter next year, and has announced a new $230,300 unit, the 1288, which can handle larger documents than the 1287, for early in 1970.

The new system, which is currently being demonstrated in the Midwest, can read forms of up to 9 x 14, more than twice the capacity of the 1287. Reading rate per character remains between 1 and 3 milliseconds, as on the 1287.

Standard Font

The full alphabetic font capability which has been added can be typewritten with a suitable Selectric type element and is part of the U.S.A. Standard Character Set for Optical Character Recognition. Only upper case alphabetics are available, together with numerics and 11 special characters.

In addition, the 1288 will be able to read machine printed serial numbers on forms, hand printed numbers, and mark sensing marks. The time involved is dependent upon format and other items, with the alphabetics taking 1.1 milliseconds each, and the hand written numbers taking 3.0 milliseconds.

Reading Time

The reading time per typewritten line, which can be roughly equated to a punched card in many applications, works out at about 60 or 70 milliseconds, giving a throughput equivalent to a 1000 card/minute card reader.

Single spaced typewritten documents can be read at about 840 standard pages an hour, or 14 a minute. Smaller documents, such as utility bills, can be read automatically into the computer at about 19,600 an hour.

A company using the new optical reader does not have to convert data into punched cards. The information is transmitted directly into the computer, where it can be used to update records, generate management and operating reports, and prepare computer printed documents.

Typical Uses

An insurance company, for example, could use the 1288 to read information from a claims form. The machine can read unformatted data, such as typewritten text describing the claim, as well as formatted items, such as policy and claim numbers.

In a manufacturing plant, the 1288 can feed the computer information from warranty claims, purchase orders, and production reports. In a government office, the machine might be used to process such documents as tax reports and license applications. Source documents used by banks, department stores, wholesalers, utilities, and publishers also can be read by the new machine.

The new IBM 1288 optical page reader can read up to 840 single spaced typewritten pages an hour and transmit the data into an IBM 360 computer.

"Less than two years ago IBM introduced the 1287 optical reader, the first commercially available machine to read hand printed numbers," said C.B. Rogers, Jr., vice president, marketing, IBM Data Processing Division. "Today's announcement of the 1288 represents a major expansion of IBM's capability in the rapidly growing field of optical character recognition."

Models 25 to 50

Like the 1287, the 1288 can be attached to 360 systems, Models 25 through 50 only. It will be supported by the same type of macros currently available for the 1287, under the Disk Operating System and the Tape Operating System.

Programmer Is Indicted

(Continued from Page 1)

Computers Involved?

Assistant U.S. Attorney John R. Sutton said he "did not know or care" whether Gottlob held an EDP job in 1964 and 1965. Gottlob was working at the Defense Support Agency, a federal installation, at the time of his arrest.

Gottlob filed no income tax return for 1964, claiming that he won $188,982 that year but lost almost all of it, the government said.

In 1965, Gottlob reported gambling winnings of $106,223 and stated that he lost most of it, the government said. He reported a taxable income of $2,320 and paid $341 in taxes. But the government said he should have reported winnings of $161,806 and contends he should have paid taxes on $57,223 that year.

The charges are based only on the 1965 return since, the government said, it had no way at the moment of computing how much, if any, income tax Gottlob might owe for 1964.

IBM's Earnings Set New Highs; Up 46%, 36.4%

ARMONK, N.Y. – IBM has reported record second quarter earnings of $213.1 million ($1.89 a share), up 46% over last year's second quarter, and record first half earnings of $386.2 million ($3.43 a share), up 36.4% from the previous first half. Both figures reflect provisions for the 10% federal income tax surcharge.

The company also reported record gross income for the quarter of $1.7 billion, up 42%, and for the half of $3.2 billion, up 33.3%.

IBM Chairman Thomas J. Watson, Jr. said that "the abnormally high growth rate for the first six months is largely the result of a substantially increased level of outright sales of data processing products over that experienced in the first six months of 1967. Outright sales, unlike rentals, have the effect of increasing current income at the expense of income in future periods," he said.

Watson said the company does not expect the high sales level to continue indefinitely.

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